

Disaster Risk Reduction, Health and Sustainable Development: The Case of The Philippines



-Trabajo de Fin de Máster-

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Fecha de entrega: 8 de mayo de 2020

ABSTRACT

Climate change is increasingly causing changes in the intensity of extreme weather events, rising sea levels and infectious disease distribution. It is affecting the economic, environmental and social determinants of health, and it will continue to increase migration and internal displacements of people, conflicts over natural resources and fragmented policy-making processes. While it is known to be one of the most serious threats to development, its impact is dependent on people's level of exposure (age, education, income and health status and access to public services). As climate-related disasters in developing countries pose a challenge for the implementation of the Sustainable Development Goals, we should analyze development plans from a Disaster Risk Reduction perspective. The Philippines is among the most vulnerable countries to the health impacts of climate change and is considered to have a strong experience in DRR. Understanding how disaster management in this country can contribute to the implementation of the SDGs, focused on health, is highly relevant. So, what can we learn from this model? The aim of this paper is to conduct a qualitative analysis with the Philippines model as an example of development policy adaptation and a DRR-centered system in the context of climate change.

Keywords: Climate Change, Human Health, Disaster Risk Reduction, Sustainable Development

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LIST OF ABBREVIATIONS

CCA	Climate Change Adaptation
DILG	Department of Interior and Local Government
DOH	Department of Health
DOST	Department of Science and Technology
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
DSWD	Department of Social Welfare and Development
GAR	Global Assessment Report on Disaster Risk Reduction
HFA	Hyogo Framework for Action
IHR	International Health Regulations
IPCC	Intergovernmental Panel on Climate Change
NAP	National adaptation plan
NCD	Non-communicable disease
NDRRMP	National Disaster Risk Reduction and Management Plan
NEDA	National Economic and Development Authority
NTD	Neglected tropical disease
PDP	Philippine Development Plan
SDG	Sustainable Development Goals
UN	United Nations
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNDRR	United Nations Office for Disaster Risk Reduction
VBD	Vector-borne disease
WHO	World Health Organization

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1. INTRODUCTION

In recent years, climate change has become one of the most serious threats to human health and sustainable development. According to the latest reports of the Intergovernmental Panel on Climate Change (IPCC), the effects of climate change include, among others, rising sea levels, increased air and ocean temperatures, and alterations in the intensity and frequency of extreme weather events such as cyclones, floods and droughts – which can be, to a certain extent, attributable to human activity.¹ These climate-related hazards can be burdensome in some high-risk countries, hindering development processes and the implementation of the Sustainable Development Goals (SDG). Unfortunately, due to the gravity of the effects of climate change, it is expected to continue impacting ecosystems and whole populations for many decades to come.

The 2030 Agenda for Sustainable Development includes a total of 25 targets for reducing climate risks and building resilience in vulnerable communities. For instance, strengthening adaptive capacities to climate-related hazards and disasters in Goal 13 (Take urgent action to combat climate change and its impacts); building resilience in all countries for the management of national and global health risks in Goal 3 (Ensure healthy lives and promote well-being for all at all ages)²; or reducing exposure and vulnerability to disasters by constructing resilient and sustainable infrastructure in Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable)³.

As we can see, Disaster Risk Reduction (DRR) is considered to be an intrinsic part of sustainable development. Nevertheless, the international jurisprudence in development has mainly referred to it with regard to building climate-resilient housing and infrastructure – namely Goal 11 in the 2030 Agenda. It is unquestionable that this is one of the main aspects that links risk management and development, however, there are other factors to be included. Furthermore, academic research is scarce as to the contribution of DRR to development plans in most at-risk

¹ IPCC AR5, Climate Change 2014, *Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects*, New York, 2014, Cambridge University Press, p. 4 - 6

² UNGA (A/RES/70/1), *Transforming Our World: the 2030 Agenda for Sustainable Development*, 2015, Goal 3, p.17

³ UNGA (A/RES/70/1), p.22

countries to the effects of climate change, and particularly from a human health perspective (rather than infrastructure). Therefore, the purpose of this paper is to examine, through a case study, how Disaster Risk Reduction and Management (DRRM) frameworks can lead to risk-informed development plans, and thereby to the implementation of SDG 3 (Good Health and Well-being).

Climate-related hazards can have direct, indirect and/or delayed impacts on people's health. By direct impacts it is understood, for instance the events of injury or death from natural hazards. On the other side, indirect impacts involve infectious disease outbreaks and changing patterns in disease distribution due to damaged environmental conditions. Lastly, delayed impacts are strongly linked to the country's coping and adaptive capacity, as well as the people's level of exposure – namely their income, education, age, and access to services including health, social and communication services. This can lead to severe consequences such as conflict over natural resources, increased migrations and internal displacements of persons, political instability, and fragmented policy-making processes⁴. Most importantly, it can pose a challenge for achieving SDG 3, therefore slowing down the human development process.

The Southeast Asian region, and more specifically the Philippines (ranked third in the *World Risk Report* of 2018 in terms of exposure and most at-risk worldwide after the Pacific Island countries of Vanuatu and Tonga)⁵, is among the most vulnerable populations in the world to the impacts of climate change, especially on human health. Due to its high-risk profile, the Philippines is an example of a strongly developed system in DRR and development policy adaptation, and therefore is very suitable for a case study that will help us achieve a better understanding, and hopefully contribute to previous research on this topic.

But how is it possible to achieve the effective management of risks and resilience building in such countries while contributing to long-term sustainability? One way of conducting disaster prevention, preparedness and immediate emergency response operations while contributing to a subsequent progress in development is, according to the United Nations Development Program (UNDP), by adopting an integrated risk management approach. This requires comprehensive

⁴ MCLVER, L., KIM, R. et al, "Health Impacts of Climate Change in Pacific Island Countries: A Regional Assessment of Vulnerabilities and Adaptation Priorities", *Environmental Health Perspectives*, Vol. 124, 2016, nº 11, p. 1708

⁵ HEINTZE, H-J., KIRCH, L. et al, "World Risk Report 2018", 2018, *Bündnis Entwicklung Hilft and UNU-EHS*, p.7

knowledge and understanding of the potential risks caused by environmental degradation, but also frequent revision and adaptation of development plans, and demographic, technologic, economic and institutional changes in society.

On one side, risk management frameworks aim to anticipate future risk and reduce its likelihood. The *Sendai Framework for Disaster Risk Reduction* is an international agreement (adopted in 2015) that sets the guidelines for preventing and reducing disaster risks worldwide (which will be one of the points of reference in our analysis). On the other side, development processes seek to improve well-being, livelihoods and infrastructure.⁶ As mentioned above, the 2030 Agenda for Sustainable Development (the international framework for sustainable development, to eradicate poverty and transform the world) emphasizes the urgent need to reduce the risk of disasters as part of the development process in vulnerable areas.

As the number of climate-related hazards is increasing and posing a huge challenge for the progress towards sustainable development, it is highly pertinent to study national development plans from a DRR perspective – i.e. the process of disaster prevention and preparedness that can contribute to long-term development gains. Thus, this paper aims to examine the interrelation between DRR and Sustainable Development from a health approach. This line of research can be useful for development studies in countries that are highly exposed to the effects of climate change. However, it can also provide a wider perspective on how to promote long-term health (SDG 3) in the context of human-induced disasters, epidemics or any sort of humanitarian emergency in a non-war context.

We are currently living the Covid-19 pandemic, which is equally affecting the rich and the poor. It is no longer the developing countries that are mostly affected by the virus, but rather the developed world where, in a way, governments are not as prepared for effective emergency response and recovery as they can be in some disaster-prone countries. As a result, this is bringing new discussions about future sustainability in the post-pandemic scenario. Therefore, our research on the contribution of an integrated risk management approach to the implementation of SDG 3

⁶ MORDT, M., *Disaster Risk Reduction and Sustainable Development, Two Sides of the Same Coin*, 2017, UNDP, [online], Available in: <https://www.undp.org/content/undp/en/home/blog/2017/3/17/Disaster-risk-reduction-and-sustainable-development-two-sides-of-the-same-coin.html>

can be relevant and applied to achieve certain understanding on the importance of prevention to minimize subsequent health impacts of natural/human-made disasters or, in this case, a pandemic.

In order to attain a consistent research, this case study will be conducted through an extensive qualitative analysis focused on national DRRM and development plans, based on the theoretical framework of the 2030 Agenda and the interlinkage between the SDGs. It is relevant to mention that there are official United Nations (UN) reports that measure the interactions between SDGs, which will certainly be reviewed in the following section as they are essential to complete our theoretical grounds. Moreover, considering the complexity of this subject, it is appropriate to complement the qualitative analysis with relevant data – such as health or climate indicators –, which will be extracted from reliable sources. Despite the research being focused on the case of the Philippines, it might also be significant to understand the situation in neighboring Pacific Island countries that are experiencing similar climate conditions.

The following chapter will be an introductory section to the theoretical framework mentioned above where we will contextualize general concepts through the lens of the 2030 Agenda (focused on health). We will present briefly the Sustainable Development Agenda, the relevant Goals for this research paper, the specific targets, and their interrelation. In order to deepen and complete the analysis of these interactions between SDGs, we will include an examination of IPCC reports on the health impacts of climate change. The last part of the theoretical framework will be an introduction to DRR, including basic concepts related to vulnerability and exposure, and finally we will refer to these elements with the Philippines as the focus of our case study. Thereafter will come the analysis section in which we will link the concepts explained in the theoretical groundwork – namely DRR and sustainable development in the Philippines. Finally, we will conclude with a chapter examining the lessons learned from the Philippine model, and a brief summary of the key findings of this paper.

2. THEORETICAL FRAMEWORK

2.1. The 2030 Agenda for Sustainable Development

In 2015, the 2030 Agenda for Sustainable Development was adopted by all UN Members States (A/RES/70/1) as a subsequent plan to the one established in the UN Millennium Goals. In fact, 2015 was a historic year for multilateralism and international policy shaping as the Paris

Agreement and the Sendai Framework on Disaster Risk Reduction were adopted in the context of a climate crisis, alongside the 2030 Agenda. The Sustainable Development Agenda sets a 15-year plan with 17 Goals and 169 specific targets to end poverty, protect the planet by addressing the climate emergency, empower women and girls, and improve livelihoods for everyone, everywhere.⁷ These Goals are considered to be indivisible and of “critical importance for humanity and the planet”⁸, including the three dimensions of sustainable development – i.e. the economic, social and environmental. For the first time in history, these three elements of development have been included in an international agenda with very specific targets, which is proof of the extraordinary effort made by the UN General Assembly (UNGA). The SDG in the Agenda are the following:

Sustainable Development Goals

Goal 1. End poverty in all its forms everywhere

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5. Achieve gender equality and empower all women and girls

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12. Ensure sustainable consumption and production patterns

Goal 13. Take urgent action to combat climate change and its impacts

⁷ UNGA (A/RES/70/1), p.1

⁸ UNGA (A/RES/70/1), p.1

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Table 1. Sustainable Development Goals⁹

As shown in the table above, there is a large variety of goals that cover all sectors of society and of the planet as a whole, complementing each other, taking into consideration the necessities of developing countries, and promoting international cooperation for achieving sustainable development for all. Although the degree of interdependence between them can vary from one goal to another, it is necessary to remember that all of them constitute a whole and are indivisible. However, for the purpose of this paper, the focus will be on Goal 3 and Goal 13 (and their interactions) rather than on the whole 2030 Agenda, as doing otherwise would require a much larger research.



2.1.1. Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 3 in the 2030 Agenda for Sustainable Development covers the necessity of ensuring universal health and well-being for all at all ages.

This Goal is crucial for development considering that a healthy population is needed to achieve the rest of the Goals, and it aims to fulfil nine targets that include: reducing the global maternal mortality ratio as well as neonatal mortality; combating and ending the epidemics of AIDS, tuberculosis, malaria and other communicable diseases; promoting prevention measures to reduce premature mortality from non-communicable diseases; strengthening the treatment of substance abuse, and more specifically narcotic drugs and alcohol; halving the number of deaths from traffic accidents; ensuring universal access to sexual and reproductive health services; achieving universal health coverage including health-care services and affordable

⁹ UNGA (A/RES/70/1), p. 14

medicines and vaccines for all; reducing the number of deaths and illnesses caused by pollution; reinforcing the implementation of the Convention on Tobacco Control; supporting the development of vaccines and medicines for communicable and *non-communicable diseases* (NCDs) considering the special needs of developing countries; increasing health financing and strengthening health workforce in developing countries; and building capacity for disaster risk management (DRM) and global health risks.¹⁰

Although there has been certain progress made on this objective, many more efforts are needed. According to the Sustainable Development Goals Report of 2019, some of the improvements in health from a global perspective constitute, among others, a substantial decrease in child mortality – from 9.8 million in 2000 to 5.4 in 2017 –, a decline of 37% in the HIV incidence rate between 2010 and 2017 among adults between 15-49 years old in Sub-Saharan Africa, and a major contribution of vaccinations to combat measles deaths – which dropped an 80% between 2000 and 2017.¹¹

However, there is still a long way to go in order to fully meet the targets set by Goal 3, and more specifically when addressing health emergencies in disaster-prone countries such as the Philippines. For instance, the progress of the fight against malaria is at standstill as the number of cases was extremely higher in 2017 compared to 2016.¹² Furthermore, *neglected tropical diseases* (NTDs) pose a huge challenge and a burden on the economy as the Philippines are already in a vulnerable situation, with limited access to health-care services, and in close contact with vectors.¹³ Increased efforts are also needed in providing efficient funding in health systems, improving sanitation, hygiene, access to health personnel and physicians, but most importantly, strengthening the capacity to respond to public health emergencies considering that almost all the WHO State Parties are better in detection than in preparedness and response to such emergencies.¹⁴ The

¹⁰ UNGA (A/RES/70/1), p.16-17

¹¹ UN, *The Sustainable Development Goals Report 2019*, New York, 2019, p.6

¹² UN, *The Sustainable Development Goals Report 2019*, p.6

¹³ UNDP Philippines, *Sustainable Development Goals, Goal 3: Good Health and Well-being*, [online], Available at: <https://www.ph.undp.org/content/philippines/en/home/sustainable-development-goals/goal-3-good-health-and-well-being.html>

¹⁴ UN, *The Sustainable Development Goals Report 2019*, p.29

response capacity in the case of the Philippines – alongside its DRR system and its contribution to sustainable development – will be reviewed more in detail in a later section of this paper.



2.1.2. Goal 13: Take urgent action to combat climate change and its impacts

During the last three decades, global warming has generated irreversible damages on our climate-system and, in turn, on entire ecosystems, which now requires urgent collective action. This has been caused mainly by the increasing greenhouse gas emissions, which are currently 50% higher than in the 1990s.¹⁵ The drastic change in our climate-system is not only leading to a massive loss of life on earth and in the oceans, but it is also causing rising sea levels and extreme weather events, from tropical cyclones and flooding to severe droughts.

Goal 13 on the 2030 Agenda for Sustainable Development exhorts all UN Members States to take urgent action to fight climate change and all its impacts by reaching three specific targets: building resilience and capacity in all countries to prepare and respond to climate-related hazards; integrating climate change as a central element in national policies and development plans; promoting education and awareness on climate change mitigation, human and institutional capacity, disaster risk reduction and adaptation; mobilizing \$100 billion annually by 2020 to address the needs of developing countries in mitigating climate-related disasters; helping the least developed countries and small island States in vulnerable regions (including a focus on women, youth and marginalized communities), to adapt and improve their capacity for effective disaster risk management.¹⁶

As of 2019, 186 Parties had ratified the Paris Agreement, which is a comprehensive plan for mitigating climate change by holding the increase of the global average temperature below 2°C above the pre-industrial baseline, and, if possible, below 1.5°C.¹⁷ In order to meet the target of the

¹⁵ UNDP Philippines, *Sustainable Development Goals, Goal 13: Climate Action*, [online], Available at: <https://www.ph.undp.org/content/philippines/en/home/sustainable-development-goals/goal-13-climate-action.html>

¹⁶ UNGA (A/RES/70/1), p.23

¹⁷ UNFCCC, *Paris Agreement*, Paris, 2015, p.3

Paris Agreement, greenhouse gas emissions should drop 55% as of 2010 levels by 2030, and continue a decline to zero emissions by 2050.¹⁸ However, although in 2018 the global temperature was already approximately 1°C above pre-industrial levels, and despite an increase of 17% in global climate finance flows between 2015-2016 compared with 2013-214, investment in climate activities remains overshadowed by investments in fossil fuels.¹⁹

On the other side, the Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted in the context of an increasing vulnerability and exposure to the effects of climate change to set priorities for action and reduce disaster risks (which is also the base of Goal 13), having into account that climate-related disasters caused an estimated 1.3 million deaths between 1998 and 2017. As a result, many countries have begun to integrate DRR strategies into their national adaptation plans (NAPs), aligned with the Sendai Framework. These NAPs might contribute to achieve the targets set by Goal 13 as well as the Paris Agreement by enhancing their adaptive capacity and strengthening their resilience, however, the biggest challenge remains the finance deficiency in DRR.²⁰

2.2. Key Interactions

The 2030 Agenda for Sustainable Development is composed by 17 SDGs that include economic, social and environmental targets which are an “indivisible whole”.²² The Preamble of the Agenda indicates that in order to fulfil its purpose (to improve all livelihoods and transform our world), it is of crucial importance to understand the interlinkages between the SDGs and their integrated nature.²³ Despite “policy coherence” being one of the targets set in the Agenda,

Table 2. **Goals Scoring**²¹

Interaction	Name	Explanation
+3	Indivisible	Inextricably linked to the achievement of another goal.
+2	Reinforcing	Aids the achievement of another goal.
+1	Enabling	Creates conditions that further another goal.
0	Consistent	No significant positive or negative interactions.
-1	Constraining	Limits options on another goal.
-2	Counteracting	Clashes with another goal.
-3	Cancelling	Makes it impossible to reach another goal.

¹⁸ UN, *The Sustainable Development Goals Report 2019*, p.48

¹⁹ UN, *The Sustainable Development Goals Report 2019*, p.48

²⁰ UN, *The Sustainable Development Goals Report 2019*, p.48

²¹ Nilsson, M., Griggs, D., and Martin, V., “Map the interactions between Sustainable Development Goals”, 2016, Macmillan Publishers, Nature, Vol 354, p.321

²² Nilsson, M., Griggs, D., and Martin, V., p. 320

²³ UNGA (A/RES/70/1), p.2

the problem is that policymakers operate in separate ministries towards different goals, and therefore it is necessary to develop an efficient operational and systemic thinking in order to avoid unfavourable outcomes.²⁴

Experts in sustainable development have developed a scale to organize SDG interactions and help policymakers to identify positive directions for development, which can vary between countries depending on their degree of development and national circumstances. As shown in table 2, there are seven possible types of interactions from most positive (+3) to most negative (−3), which should be examined through four main aspects including the strength of the interaction, the direction, the certainty, and whether or not it is reversible.²⁵

2.2.1. SDG 3 + SDG 13

Although health impacts from climate change are very broad and can be direct – such as the health consequences of severe weather events or disasters –, or indirect – as for instance food insecurity and undernutrition –, the study of interactions between Goal 3 and Goal 13 remains quite scarce as it is mainly focused on the health issue caused by air pollution.

Research shows that there are two key interactions between these SDGs, positive and negative. The first one, in which the score is +3, is between the health impacts of air, water and soil pollution (3.9) and the integration of climate change measures into national policies, strategies and planning (13.2), as these will contribute to mitigate climate change, improve air quality and, in turn, benefit health. The second one, with score −1, is between premature mortality from NCDs (3.4) and, again, the adoption of climate change measures (13.2), as reducing the emissions could lead to higher unemployment rates, affect the economy and indirectly constrain health, which could be avoided by the adoption of policies that favour the transition to an economy based on renewable energy, supporting the workers in the fossil fuel industries.²⁶

²⁴ Nilsson, M., Griggs, D., and Martin, V., 321

²⁵ Nilsson, M., Griggs, D., and Martin, V., 321 - 322

²⁶ HOWDEN-CHAPMAN, P., SIRI J., et al., “SDG 3 Ensure Healthy Lives and Promote Wellbeing for All at ALL Ages”, 2017, p.113

However, the focus has been on the first interaction (3.9 – 13.2) as the correlation is positive and largely unidirectional. Firstly, it is important to understand that most greenhouse emissions derive from the combustion of fossil fuels, which affects air quality and the climate-system, and therefore reducing the amount of emissions will help reduce air pollution and mitigate climate change. Secondly, the short-term improvements in health from these efforts will be very moderate, however there will be long-lasting health gains and, consequently, human development.²⁷ And lastly, this can be achieved through coordination between national and international governance, taking action in the in the transport sector, taking into account the changing technologies that can contribute to climate change mitigation and adaptation, and developing new financing mechanisms to encourage developing countries to participate in the transition to a climate-friendly trajectory.²⁸

It is undeniable that taking action to mitigate climate change by integrating these measures into national policies, helping reduce the emissions and improving the air quality can be directly linked to the achievement of better health. Nevertheless, health impacts of climate change go beyond pollution. Thus, it is crucial to examine the exact effects (direct, indirect and delayed) in vulnerable areas, as well as various DRM frameworks to understand whether this also contributes to the implementation of other targets in Goal 3. In fact, this can also be associated with strengthening resilience and adaptive capacity to disasters (13.1) and improving human and institutional capacity on impact reduction and early warning (13.3), which will allow us to analyze further interactions on these goals other than the previously explained.

2.3. Climate Change and Human Health

The changing climate conditions are currently a hot topic in international policymaking processes as they constitute a global challenge for various sectors of society and development. According to the United Nations Framework Convention on Climate Change (UNFCCC), these can be attributed, directly or indirectly, to human activity that alters the composition of the atmosphere²⁹.

²⁷ HOWDEN-CHAPMAN, P., SIRI J., et al., p.89

²⁸ HOWDEN-CHAPMAN, P., SIRI J., et al., p.114-116

²⁹ United Nations, *United Nations Framework Convention on Climate Change*, 1992, Article 1

However, the gravity of the impacts on natural and human systems is rather locally-focused and depends on the degree of *exposure* – for instance, the presence of people, resources or infrastructure in places or settings that could be negatively affected by climate-related hazards³⁰ – which varies in different areas of the world. Thus, we can say that location has a significant role in regard to the health impacts of climate change.

Another important aspect which is also constrained by geographic factors is *vulnerability* – i.e. the propensity to be adversely affected due to the lack of capacity to cope and adapt.³¹ According to the IPCC, the most vulnerable areas to the impacts of climate change are sub-Saharan Africa (particularly affected by droughts and floods) and Southeast Asia (distinguished by low-lying areas prone to flooding), which, in both cases (and especially in rural populations) are highly dependent on natural resources and have a limited access to health-care services – and higher levels of social and economic disadvantage in general.³²

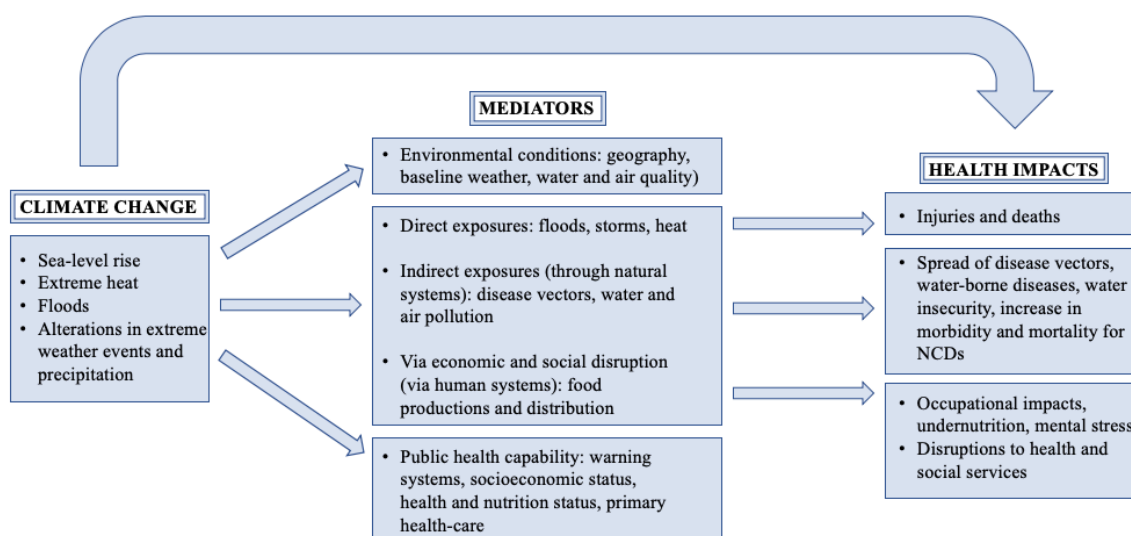


Figure 1. Health impact pathways of climate change

Besides the geographic element, vulnerability to disease and injury (as well as other harmful impacts of climate variability) can be magnified by different causes. For instance, these involve

³⁰ IPCC AR5, p. 5

³¹ IPCC AR5, p. 5

³² IPCC AR5, p. 717

the current health status – meaning the pre-existing health issues in those areas –, and more specifically chronic NCDs that will interact with poverty, malnutrition and extreme weather events, which will aggravate the health consequences of climate-related hazards; age is an important element as children are more at risk regarding, on one side, heat-related illnesses due to their small body mass – alongside the elderly that are also a risk group because of their limited mobility and inability to respond to stressors during extreme weather events –, and on the other side, food security. Vulnerability also poses a gender issue as, according to the WHO, the worldwide mortality rate caused by natural hazards is higher among women than men (especially considering that pregnancy is a period of higher sensitivity), however, the level of exposure between men and women varies regionally and depends on occupational settings.

Although disaster-prone areas tend to be the poorest countries, wealthy countries can also be affected by climate variability and, in this case, the socioeconomic status of individuals and households will determine the severity of the damages that affect each one of them, which, in many countries is often related to race and ethnicity; and finally, populations with limited access to health-care services and infrastructure including supply of water, power, sanitation and waste management, will be more adversely affected and have higher health risks.³³

The way in which climate change affects human health in vulnerable areas has been divided into three categories in the IPCC's assessment reports, depending on the mediating factors that lead to different health issues (see Figure 1). As mentioned before, these include direct, indirect and delayed impacts, which will be explained more in depth in the following sections having into consideration the various factors presented above that contribute to higher vulnerability.

2.3.1. Direct health impacts of climate change

Primary or direct health impacts of climate variability are related to the changing frequency and intensity of extreme weather events such as cyclones, flooding and droughts, but also with extreme heat, which has been defined as *anthropogenic climate change*.³⁴ Although it is difficult

³³ IPCC AR5, p. 717 - 718

³⁴ IPCC AR5, p. 720

to measure the exact effects of climate change as it requires decade-long data collections and analysis, the connection between climate and health is often sufficiently direct to understand cause and effect.

Considering that the IPCC Special Report on Extreme Events (SREX) concluded that the global average temperature has increased during the past decades, if we analyze climate change from an anthropocentric approach we see that the mortality rate during hot days and heat waves has also increased – which in turn, has contributed to a significant decline in deaths associated with cold periods.³⁵ Research shows the physiological reasons for these deaths, which is mainly affecting elder people with previous pathologies in high-income countries, but also physically active people in certain occupational settings that expose them to the heat.³⁶ The challenge here remains the high uncertainty regarding social, technological and physiological adaptation to the increasing heat.

On the other side, flooding caused by intense storms and cyclones are, unfortunately, the most frequent type of natural hazard. Although it is difficult to determine the exact health trends attributable to flooding, mortality is the most direct and measurable indicator, along with injuries, drowning and infectious disease outbreaks, all of which can vary from country to country.

Recent studies present longer-term mental health impacts of flooding and storms, and more specifically among people whose homes were flooded.³⁷ That is a delayed impact on health rather than a direct one, and it will be discussed more in detail in section 2.3.3. Furthermore, there is evidence that shows a correlation between economic development and a decline in mortality due to flooding and extreme weather events, which is dropping globally. Nevertheless, despite the fact that a country's economic development can contribute to lower its mortality rates, the frequency in storms and flooding is likely to keep increasing in the coming years, alongside the economic losses caused by population displacements and high demands of emergency aid, which, as a result, may increase population exposure at a faster pace than normal.³⁸

³⁵ IPCC AR5, p. 720

³⁶ IPCC AR5, p. 721

³⁷ IPCC AR5, p. 722

³⁸ IPCC AR5, p. 721

2.3.2. *Impacts through natural systems*

Secondary impacts are caused by indirect exposure to the effects of climate change and are usually transmitted through natural systems. These include, for instance, *vector-borne diseases* (VBDs), water- and food-borne infections, air pollutions and other infectious diseases.

For VBDs we understand infectious diseases transmitted by blood-sucking insects such as mosquitoes or ticks, which are associated with climate change due to their sensitivity to climate and increased temperature variations.³⁹ Extreme precipitations and cyclones result in high humidity and water pooling that generate the perfect conditions for mosquito and insect breeding. Sadly, the most common example is the case of malaria, which is found mostly among children and, although there has been major progress in control interventions to combat this disease over the past two decades, it remains one of the most common infections (especially in high-burden African countries⁴⁰). As we can see, there is yet much work to be done.

Another example is Dengue fever, which is mostly common in the Asia-Pacific region and the most rapidly spreading disease, affecting each year an estimate 390 million people worldwide.⁴¹ Rainfall and humidity favor the spread of dengue fever incidences. However, drought can also contribute to the incubation of this disease if households use big containers to store water (suitable for mosquito breeding).

The ingestion of contaminated water or food, or simply by direct contact with eyes, ears or open wounds is another type of exposure to climate-sensitive pathogens which adversely affects human health. Climate variability and extreme precipitations can lead to alterations in ecosystems such as changes in salinity or in pH which, in turn, contributes to the development, transmission or virulence of pathogens.⁴² For instance, when a country that lacks a secure disposal of fecal waste experiences heavy rainfall, there can be cholera outbreaks. According to the WHO, cholera is a disease that affects the digestive system and kills within hours if it remains untreated. Research

³⁹ IPCC AR5, p. 723

⁴⁰ UN, *The Sustainable Development Goals Report 2019*, p.6

⁴¹ IPCC AR5, p. 723

⁴² IPCC AR5, p. 726

shows that cholera affects an estimate 1.3 million to 4 million people worldwide, causing between 21.000 to 143.000 deaths, which is a significant number.⁴³ There is large evidence that proves that such infectious diseases are climate-sensitive as their spread and transmission depends on temperature increase, the intensity of weather events combined with the conditions of local ecosystems.

Lastly, air quality also has an important role on health, which is not directly climate-related but rather connected to air pollutants. When talking about air quality we can include emissions of CO₂ and non-CO₂ climate pollutants that can be damaging for health directly – causing respiratory diseases –, or indirectly – as they can contribute, for instance, to ocean acidification and alteration of agriculture fertilization; increased long-term outdoor exposure due to the destruction of ozone caused by a combo of pollution and high temperatures; acute air pollution episodes as wildfires, releasing toxic particles into the air that can affect people in the short- and medium-term; and alterations in the patterns of allergic diseases or asthma as they are highly climate sensitive and go most commonly “with the season”.⁴⁴

2.3.3. Impacts through human systems

The last type of impacts is the tertiary, or the so-called “delayed effects”, generated through the deterioration of human systems such as economic or social disruption, or simply by interrupting local food production and distribution.

Climate change can be seen as a threat to agricultural production in countries that already have issues with food insecurity as high temperatures and heavy rainfalls can affect the quality and the quantity of the food harvested, leading to high levels of undernutrition and stunting – especially among children considering that 45% of under-five deaths in low- and middle-income countries are related to undernutrition, according to the WHO⁴⁵.

⁴³ World Health Organization, Fact Sheets, “Cholera”, 2019, [online], Available at: <https://www.who.int/news-room/fact-sheets/detail/cholera>

⁴⁴ IPCC AR5, p. 727 - 730

⁴⁵ World Health Organization, Fact Sheets, “Malnutrition”, 2020, [online], Available at: <https://www.who.int/news-room/fact-sheets/detail/malnutrition>

It is relevant to make the distinction between *undernutrition* – which involves undernourishment and scarcity in the calories received by the population –, and *malnutrition* – which includes overnutrition and undernutrition.⁴⁶ Nutrition, on the other side, is composed by the combination of food production, socioeconomic factors (prices and access to food), and human health. Thus, if heat waves, extreme weather events, floods or droughts affect the food production chain, food availability declines and the prices rise, which has negative effects on food consumption, and consequently on health.

Another factor of concern regarding the impacts of climate change is occupational health. Although there are international standards that regulate the recommended exposure to heat at the workplace, more than 50% of all labor worldwide occurs outdoors, and more concretely agriculture and construction, so it is extremely difficult to control. Workers in these professions in tropical developing countries where there is limited access to shade or water, are among the most exposed to heat and climate-sensitive infectious diseases. For instance, they are at risk of contracting heat strain or heat strokes.

On the other side, there is a conflict of interests between health protection of the workers and economic productivity considering that longer rests to avoid heat stress may contribute to a decrease in hourly productivity and economic loss, which can, in turn, put livelihoods in jeopardy. Moreover, in areas where the climatic conditions are favorable for mosquito breeding and the transmission of vector-borne diseases – such as malaria or dengue fever –, workers in fields and even health workers are prone to experience higher incidence of these infectious diseases, increasing the risk of injuries and affecting their psychomotor and cognitive performance.⁴⁷

The consequences of climate change on people's mental health can vary depending on the event experienced. Some of the issues that might arise include stress (especially among those that are already mentally ill) caused by heat waves, floods or droughts; psychiatric trauma, severe anxiety, depression, aggression and other complex psychopathologies after manifestations of climate-related disasters; chronic psychological distress and increased suicide rates due to

⁴⁶ IPCC AR5, p. 730

⁴⁷ IPCC AR5, p. 731 - 732

prolonged events such as droughts; and finally, as mentioned in the previous section, a distressing sense of loss when flooding or cyclones damage their land and property.⁴⁸

Finally, it is relevant to mention that, although the relation between climate change and violence is not direct, the degradation of land and ecosystems, the limited access to food and water, and the disruption of social and health systems may be a significant factor influencing tension within populations and contributing to conflict and violence.

2.4. Disaster Risk Reduction

The wide variety of health impacts of climate-related disasters presented above pose a tremendous challenge for human development and, as a result, for development as a whole – considering that the negative consequences affect approximately 190 million people worldwide with more than 77.000 deaths⁴⁹.

To avoid irreversible damages from hazardous events on human health, public services or infrastructure, it is crucial to build resilience and develop strong DRR systems to cope, adapt and learn through prevention and preparedness, but most importantly to minimize and mitigate risk – which is essentially the result from the interaction of hazard, exposure and vulnerability.⁵⁰ This is the essence of DRR covered in the *Sendai Framework for Disaster Risk Reduction 2015-2030* (Sendai Framework), which is the successor instrument to the Hyogo Framework for Action (HFA) and the first major international agreement post 2030 Agenda for Sustainable Development.

The Sendai Framework was adopted at the Third UN World Conference in Japan, at the request of the UNGA and with the support of the United Nations Office for Disaster Risk Reduction. The aim was to provide member States with coherent guidelines to improve livelihoods and protect all human rights while protecting development from the risks of environmental, technological or biological hazards by attributing the main responsibility of reducing disaster risk to the State, but

⁴⁸ IPCC AR5, p. 732

⁴⁹ WHO (2019), *Health Emergency and Disaster Risk Management Framework (Health EDRMF)*, Geneva, World Health Organization (WHO), p. 2

⁵⁰ IPCC AR5, p. 5

also acknowledging the vital need of cooperation with other stakeholders such as local or regional governments, as well as the private sector.⁵¹

The Sendai Framework recognizes the risks of natural or manmade hazards on human health – namely the vulnerability and exposure to the effects of climate change that might lead to negative impacts on health. It encourages States to develop and strengthen the implementation of policies and strategies through DRR agendas to achieve growth, health and safety, food security, environmental management, and subsequently sustainable development by supporting developing countries, and therefore making international cooperation more effective and meaningful.⁵²

Some of the targets related to health in the Sendai Framework include reducing global disaster mortality by 2030, reducing disaster damage to health facilities, and improving the access to early warning systems and information for people⁵³, which can be achieved through some of the points established in the four *Priorities for Action* on the Framework:

- **Priority 1. Understanding disaster risk:** It is crucial to have full understanding of disaster risk and the socioeconomic, health and cultural impacts, as well as the environmental conditions, the potential vulnerability, exposure and coping capacity of the country in order to develop and implement adequate policies adapted to each hazardous event. For this purpose, the Sendai Framework proposes the use of relevant data and information, making it accessible for everyone to achieve solid early warning systems by involving NGOs, the scientific and technological community, and the civilian population.⁵⁴
- **Priority 2. Strengthening disaster risk governance to manage disaster risk:** The inclusion of the national, regional and global dimensions of disaster risk governance is of great importance to ensure the compliance and coherence of existing national and local regulations – such as health and safety standards – and update them if needed to address disaster risk appropriately. This implies defining responsibilities and involving the public

⁵¹ UNISDR, (2015), *Sendai Framework for Disaster Risk Reduction 2015-2030*, Sendai, p. 10-11

⁵² UNISDR, *Sendai Framework*, p. 13-14

⁵³ UNISDR, (2015), *Chart of the Sendai Framework for Disaster Risk Reduction 2015-2030*, Sendai

⁵⁴ UNISDR, *Sendai Framework*, p. 14-16

and private sectors to take action by increasing the coordination between government institutions and other relevant stakeholders, which will contribute to the strengthening of health resilience (apart from economic, social and environmental).⁵⁵

- **Priority 3. Investing in disaster risk reduction for resilience:** In order to build resilient national health systems and enhance the cooperation between health authorities, it is vital to design effective financing mechanisms involving public and private investment in disaster risk management. One way of doing this is by adopting inclusive measures and policies that take into account the special needs of people with chronic diseases (for instance), integrating DRM into primary, secondary and tertiary health care, empowering health workers by providing, for instance, training capacity in emergency medicine, improving the access to basic health-care services, and implementing the International Health Regulations (IHR)⁵⁶ – which is an international legal instrument to facilitate cooperation between countries to save lives and livelihoods from health risks and the spread of infectious diseases.⁵⁷
- **Priority 4. Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction:** Strengthening disaster preparedness, building resilience and taking action in advance – while empowering women and persons with disabilities – is key for a more effective and universal response to hazardous events and, as a result, for the subsequent recovery. Experience has shown that the rehabilitation from disasters is an opportunity to “Build Back Better”, and that it is crucial to have into account the lessons learned on best practices when adopting development policies with integrated DRR measures, which will contribute to more resilient communities.

In terms of health, the Sendai Framework emphasizes the importance of promoting the resilience of existing infrastructure, such as hospitals or other health facilities, so that they

⁵⁵ UNISDR, *Sendai Framework*, p. 17-18

⁵⁶ UNISDR, *Sendai Framework*, p. 19-20

⁵⁷ World Health Organization, Regional Office for Europe, *International Health Regulations: Fact Sheet*, 2005

can provide with vital services during and after disasters; to update applicable legislation for international disaster relief (among others); and to develop support systems aimed to address mental health and psychosocial issues of people in need.⁵⁸

As we can see, the Sendai Framework provides a comprehensive structure for building resilient communities through the integration of DRR into the socioeconomic, cultural and environmental dimensions, and how this can contribute to safeguarding human health and national health systems in disaster situations.

2.4.1. *The WHO Framework for DRR*

In order to be able to implement these adaptation processes, avoid harm and reduce disaster risk, the WHO is highly committed to work alongside Member States. The work of the WHO in collecting and analyzing relevant data and information is crucial for any type of DRR-related activity of the stakeholders – including governments, the Ministry of Health, community-based organizations, NGOs and the international community.

Table 3. Change in EDRM approach⁵⁹

FROM	▶ TO
Event-based	➡ Risk-based
Reactive	➡ Proactive
Single-hazard	➡ All-hazard
Hazard-focus	➡ Vulnerability and capacity focus
Single agency	➡ Whole-of-society
Separate responsibility	➡ Shared responsibility of health systems
Response-focus	➡ Risk management
Planning for communities	➡ Planning with communities

In pursuance of reducing disaster risk and development losses in public health due to emergencies, the WHO's *Health Emergency and Disaster Risk Management Framework* (Health EDRM Framework) provides an approach focused on improving health outcomes in exposed low- and middle-income countries, vulnerable to the effects of climate change.

The Health EDRM Framework proposes a whole new method (See Table 3), in line with the Sendai Framework and the IHR, that should be applied to strengthen health systems and build resilience in all emergency situations, regardless of the cause. It

⁵⁸ UNISDR, (2015) *Sendai Framework*, p. 21-22

⁵⁹ WHO, *Health EDRMF*, p. 5

identifies a gap in traditional DRM due to fragmented approaches – which have been commonly focused on reacting rather than preventing, lacking coordination between stakeholders –, and emphasizes the need of merging the EDRM community and the health community through multisectoral pathways. These include, for instance, integrating epidemic preparedness or health systems strengthening into risk and disaster management.⁶⁰ The general vision of the Health EDRM Framework is essentially to develop resilient communities and strong healthcare systems that will provide universal health coverage and achieve the best possible health standards for people at risk of disasters.

As illustrated in Table 3, this Framework is oriented by some guiding principles including respecting the ethical values of humanity, solidarity and cultural sensitivity; basing actions on risk rather than on the event itself by reducing exposure and vulnerability; investing in preparedness to obtain a more effective response, and reconstruct smartly to minimize future risks (the Build Back Better approach presented in the Sendai Framework); developing all-hazard measures and response mechanisms complemented by risk-specific capacities as it is proven to be more cost-effective and efficient; centering health policies on the community, and more specifically on the most vulnerable – including women, children, disabled persons, refugees or people with chronic diseases –, and help them build their capacities to allow them to participate in the preparedness, response and recovery processes from hazardous events; encouraging multisectoral collaboration between health care systems and other sectors involved in DRM such as maintenance of infrastructure, water and food security, or transportation; and overall enhancing the existing health facilities.⁶¹

Generally, it is undeniable that health is an intrinsic part of DRM, covered by international frameworks for risk reduction, response and recovery. Thus, and as mentioned previously, we can say that these frameworks have fully acknowledged the health impacts of climate change, which can lead to emergencies and need coordinated actions. These established priorities for action should, in turn, contribute to the protection and improvement of lives and livelihoods from a health and well-being perspective.

⁶⁰ WHO, *Health EDRMF*, p. 3-5

⁶¹ WHO, *Health EDRMF*, p. 6-8

2.5. Vulnerable areas: the case of the Philippines

The Southeast Asian region – and more specifically archipelago states such as the Philippines – is among the most vulnerable areas to the health impacts of climate change due to high levels of exposure, alongside Sub-Saharan Africa. This vulnerability is typically a combination of socioeconomic, geographic and demographic circumstances which, depending on each country's coping and adaptive capacities, can lead to different outcomes in managing health risks (See Figure 2).⁶² Another relevant factor influencing vulnerability is the difference between urban and rural places. For instance, the limited access to healthcare services or even education in certain rural areas, where the investment in infrastructure and resources can be extremely scarce and may pose a huge problem for human health, especially during and after hazardous events.

The *World Risk Report* of 2018 is a tool that allows us to assess and compare risks and vulnerabilities in 173 different countries across the world, and it has been used by members of the parliament in the Philippines to draw attention to the relevance of including DRR in policy making procedures. The Philippines, a low- and middle income state formed by more than 7.000 islands and with an estimate population of 104 million, was ranked third most exposed State in the *World Risk Index* as it is a disaster-prone country, most commonly affected by tropical cyclones (on average 20 each year) leading to flooding, extreme weather events, heavy precipitations and landslides,⁶³ but also by other non-climate hazards such as earthquakes or tsunamis due to the location within the so-called “Ring of Fire”, between the Eurasian and the Pacific tectonic plates.

These hazardous events in the Philippines may lead to direct, indirect or delayed health impacts. Nevertheless, some health risks are vector-borne related (such as Dengue fever) due to the favourable climate conditions for mosquito breeding, but the main health issues are caused by the disruption of human systems such as education or food production, notably in agriculture, leading to undernutrition, increased poverty, mental health issues and aggravation of existing NCDs.

⁶² MCLVER, L., KIM, R. et al, p. 1708

⁶³ HEINTZE, H-J., KIRCH, L. et al, p.7

The Philippines is known for having, on one side, a high-quality healthcare system subsidised partly by the government and partly by the private sector and, on the other side, a strongly developed DRM system and adaptive capacity due to their long experience in dealing with climate-sensitive hazards. However, despite all citizens in the Philippines being theoretically entitled to free healthcare services in public hospitals in case they lack a private health insurance, the access and the quality of these services varies widely between urban and rural places⁶⁴ (where an estimate 48,8% of the overall population lives⁶⁵). On the other side, DRM frameworks take into account everyone, focusing on the needs of the most vulnerable groups to the impacts of natural hazards, including poor people, women, children, the elderly, indigenous minorities or persons with disabilities.

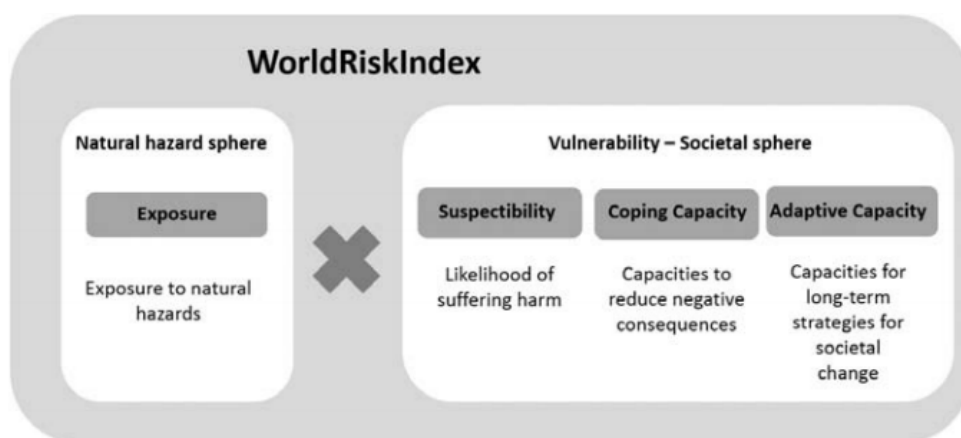


Figure 2. Concepts in the World Risk Index⁶⁶

Due to their risk-profile, experience and commitment with DRR in the context of climate change and high disaster incidence, the Philippines has, during the last two decades, integrated DRR as a national priority and adopted multiple policies, frameworks and action plans for disaster risk reduction and management (DRRM). Apart from these institutional structures, they have also developed scientific and technical mechanisms for understanding hazards and risks, and for promoting and encouraging innovation within the field.⁶⁷

⁶⁴ DAYRIT, M., LAGRADA, P.L., et al., (2018) “The Philippines Health System Review”, World Health Organization, Health Systems in Transition, Vol. 8, Nº 2, p. xxii

⁶⁵ UNDRR (2019), *Disaster Risk Reduction in the Philippines: Status Report 2019 (Status Report 2019)*, Bangkok, Regional Office for Asia and the Pacific

⁶⁶ WELLE, T. and BIRKMANN, J., (2015) “The World Risk Index – An Approach to Assess Risk and Vulnerability on a Global Scale”, World Scientific Publishing Company, J Extreme Events, Vol. 2, Nº 1, p. 30

⁶⁷ BANWELL, N., MONTOYA, J., et al. (2016), “Developing the Philippines as a Global Hub for Disaster Risk Reduction – A Health Research Initiative as Presented at the 10th Philippine National Health Research System Week

The Philippine *National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028* is the latest legal basis adopted by the Philippine Government to guide policies and activities in disaster situations at the national, regional and local level. This plan was initially created under the guidelines of the HFA, however, it has evolved throughout the years and adapted to the priorities for action established in the Sendai Framework, whose progress will be examined in section 3.2. The NDRRMP aims to achieve sustainable development by building safer, adaptive and more resilient communities through four main objectives: disaster prevention and mitigation, preparedness, response and recovery.⁶⁸ For the purpose of these objectives, it is crucial to reinforce collaboration across sectors.

As we can see, these are the four main recurring priorities in the essence of DRR, regardless of the framework, the stakeholders or the year of ratification. It is crucial to remember these four basic points to be able to understand the correlation between DRR and sustainable development, which will be the focus of the analysis in the following sections. Moreover, it is relevant to mention that the approaches must be of adaptive nature in order to be aligned with the latest international frameworks for DRR, as well as to address the changing needs, vulnerabilities, disaster patterns, demographic and economic circumstances of each country at risk.

3. CASE STUDY

3.1. DRR and Sustainable Development

Over the past years, there has been a shift in the debate of development in the context of climate change, increased vulnerabilities and high exposure in different areas across the world. The escalation of losses in human lives, health, well-being and infrastructure, and the challenge that this poses for development efforts has brought a new discussion to the table.

On one side, the 2030 Agenda for Sustainable Development includes 25 targets in 10 SDGs related to DRR, which makes it a central concept in sustainable development. Following the

Celebration”, PLOS Currents Disasters, Edition 1, [online], Available at:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5109717/>

⁶⁸ Republic of the Philippines, *National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028*, 2011, Manila

examples chosen for this paper which have been explained in previous sections, the 2030 Agenda emphasizes the urgent need of taking action to reduce disaster risks (Goal 13).

On the other side, the Sendai Framework exhorts States to integrate DRR into development plans, which creates certain interdependence between these two international agreements, regardless of their scope. According to the UNDP, this can be achieved through the so-called “integrated risk management” approach⁶⁹, which is a new way of thinking in disaster management activities.

Traditionally, emergency and disaster management has focused on the immediate response, both nationally and internationally, whilst integrated risk management involves a more thorough understanding of the risk factors and structural conditions, such as low socioeconomic status or environmental degradation in high-burden countries.

The adverse consequences of hazardous events in places where there are pre-existing vulnerability conditions are not so much related to the physical events themselves, but rather to these drivers of risk which have usually not been addressed in DRM in the past. Thus, we could say that the lack of consideration of the structural elements that contribute to risk, lead to health impacts of climate change that are generally aggravated by the inadequate planning, lack of technologies and overexploitation of natural resources.⁷⁰

Development plans aim to improve well-being and livelihoods by building more resilient communities and lower the risk levels, however, the main challenge remains to anticipate future risks in order to prevent them. According to the UNDRR Global Assessment Report on Disaster Risk Reduction (GAR) of 2019, there are five entry points through which DRR should be integrated into development:

- a) *Policy and law*: the importance of reviewing, integrating and adapting legislation, regulation, strategic plans and standards to DRR at national, sectoral and local levels to

⁶⁹ MORDT, M., [online], Available at: <https://www.undp.org/content/undp/en/home/blog/2017/3/17/Disaster-risk-reduction-and-sustainable-development-two-sides-of-the-same-coin.html>

⁷⁰ MORDT, M., [online], Available at: <https://www.undp.org/content/undp/en/home/blog/2017/3/17/Disaster-risk-reduction-and-sustainable-development-two-sides-of-the-same-coin.html>

achieve risk-informed development, policy coherence, but mainly to translate political will into specific DRM actions.⁷¹

- b) *Organization*: integrated implementation should be supported by the institutionalization of risk management, using tools from public and private organizations, and coordinating with different groups and sectors to overcome governance challenges and establish clear responsibilities.⁷²
- c) *Stakeholders*: although the government has the main role and responsibility, if DRR is to be effective it is required to involve other stakeholders such as development actors; civil society; legislators and decision makers to ensure implementation and compliance; scholars and research institutions; and the media in regard to promoting awareness and transparency.⁷³
- d) *Knowledge*: the access to information and knowledge on disaster risk, hazards and vulnerabilities is a determining factor for linking DRR to development processes. This includes promoting awareness campaigns, collaborating with public education institutions, and applying adequate monitoring and evaluation systems.⁷⁴
- e) *Finance*: developing risk-informed budgets supported by public and private donors is central to achieve sustainable development. This requires a shift in their priorities as investments are most commonly addressed to short-term actions, i.e. immediate response aid to hazards, rather than to building longer-term resilience.⁷⁵

It is evident that the achievement of an integrated risk management approach involves multisectoral action and adaptation, investment from different stakeholders at national and local levels, and resilience building that will subsequently contribute to sustainable development.

⁷¹ UNDRR (2019), *Global Assessment Report on Disaster Risk Reduction*, Geneva, United Nations Office for Disaster Risk Reduction (UNDRR), p. 338-342

⁷² UNDRR, *Global Assessment Report*, p. 343-346

⁷³ UNDRR, *Global Assessment Report*, p. 348-349

⁷⁴ UNDRR, *Global Assessment Report*, p. 346-348

⁷⁵ UNDRR, *Global Assessment Report*, p. 350-352

Although the Sendai Framework includes some points on human health in the four Priorities for Action, this new method of integral and adaptive policy- and decision-making processes has often been approached – both in practice and in academia – focusing on the improvement of poorly planned urbanization, building more resilient infrastructure and taking action to mitigate the effects of climate change. This is certainly fundamental for development and for the battle against poverty, however, we are interested in examining how this can strengthen national development plans from a human health perspective.

Considering the high-risk profile of the Philippines, as well as their expertise in DRR, it is suitable to provide a general overview of the NDRRMP to have a clear understanding of their targets and priorities, followed by the current state of DRR interventions in the Philippines under the guidelines of the Sendai Framework, setting health as the main point of reference. Thereby, this will allow us to identify the influence of DRRM on the Philippine Development Plan 2017-2022 and carry out a comprehensive analysis.

3.2. DRRM in the Philippines

Over the past years, DRR in the Philippines has gained a lot of attention, therefore the government has adopted multiple acts as the legal framework for DRRM into their legislative trends and institutional structure in line with the international standards. Thus, the Philippines is a convenient example that provides us with solid legal material, allowing us to undertake a comprehensive analysis.

3.2.1. Legal Framework

Because of its high susceptibility to natural hazards, the Philippine Government has been present, alongside 167 other nations, in the process of shaping an international framework for DRR, starting at the World Conference on Disaster Risk Reduction where the states committed to the HFA, followed by the ratification of the ASEAN Agreement on Disaster Management and Emergency Response (AADMER), and finally with the Sendai Framework.⁷⁶ As a result, the

⁷⁶ Republic of the Philippines, *NDRRMP 2011-2028*, p. 8

Philippines has developed quite exhaustive legal and operational frameworks in this matter at the national level.

The Philippine Disaster Risk Reduction and Management Act of 2010 (RA N° 10121) is aligned with the objectives of the Sendai Framework and the Paris Agreement, and it provides the legal basis for DRM activities in the country guided by the fundamental principles and standards of humanitarian assistance – namely humanity, impartiality and universality.

This policy aims to promote the implementation of national plans that address, among others, the causes of disaster vulnerabilities by building resilience, involving all sectors and stakeholders in their actions, and strengthening capacities of institutions and of the community – especially of the most vulnerable and marginalized groups. It also emphasizes the need of adopting an integrated risk management approach through the incorporation of DRR and climate change into development plans, as well as the institutionalization of policies at the local level.⁷⁷ In terms of health, the RA N° 10121 of 2010 includes four main points that should be central in any DRRM operations system.

First, the section aimed for definition of terms widely acknowledges that hazards may adversely affect human health, causing injury and loss of life or livelihood as a consequence of social disruption and environmental damage; that disaster risks are highly dependent on the socioeconomic and health status of communities; and that disaster relief should be focused on reducing health impacts and meeting the basic needs of people during and after a disaster.⁷⁸

Second, it highlights the relevance of merging DRR and climate change policy formulation with development planning and governance – and more specifically in the areas of health, water, housing and poverty reduction (among others)⁷⁹ – which is, according to the UNDRR reports, the first step towards an integrated risk management approach.

⁷⁷ Congress of the Philippines (2010), *Philippine Disaster Risk Reduction and Management Act of 2010*, 14th Congress, 3rd Regular Session, RA N° 10121

⁷⁸ Congress of the Philippines, RA N° 10121, p. 5-7

⁷⁹ Congress of the Philippines, RA N° 10121, p. 2

Third, it promotes the empowerment of health and humanitarian aid workers through adequate training programs to achieve a stronger response workforce in the event of a disaster or emergency.⁸⁰

Last but not least, it suggests the development of effective risk assessment and risk mapping mechanisms to analyse, monitor and evaluate the country's coping and adaptive capacities in respect to exposure and vulnerabilities in the social, economic and health dimensions.⁸¹

In addition, the DRRM Act of 2010 sets the guidelines for the establishment of a *National Disaster Risk Reduction and Management Council* (National Council) in which the Secretary of the Department of Health (DOH) is among the main members – alongside others such as the Secretary of the Department of Environment and Natural Resources, the Department of Education, the Department of Finance, etcetera. Some of the tasks attributed to the National Council include policy-making processes, coordination, monitoring and evaluation operations through the development of early warning systems and assessment tools, and encouraging multi-sectoral participation.⁸²

3.2.2. Operational Framework

On the other side, the NDRRMP provides the operational plan, fulfilling the legal requirements established in the DRRM Act of 2010, to address disasters, establish clear directions for key activities in the short-, middle- and long-term, the expected outcomes and the involvement of different stakeholders. As mentioned in a previous section, the general vision of the NDRRMP is to achieve the goal of “*safer, adaptive and disaster resilient Filipino communities towards sustainable development*”⁸³, and the action plan has been divided into four thematic areas (See Figure 3).

⁸⁰ Congress of the Philippines, RA N° 10121, p. 3

⁸¹ Congress of the Philippines, RA N° 10121, p. 9

⁸² Congress of the Philippines, RA N° 10121, p. 10-14

⁸³ Republic of the Philippines, *NDRRMP 2011-2028*

It is worth mentioning that the NDRRMP presents a series of cross-cutting concerns, one of which is related to health. It points out that the multiple health consequences of natural and climate-related hazards, being direct, indirect or delayed, should necessarily be looked at in each thematic area in the plan – meaning that certain concerns, such as health, cross all four areas of action and should therefore be considered in the process.⁸⁴ For that reason, the DOH is present in all areas, as we will see below.

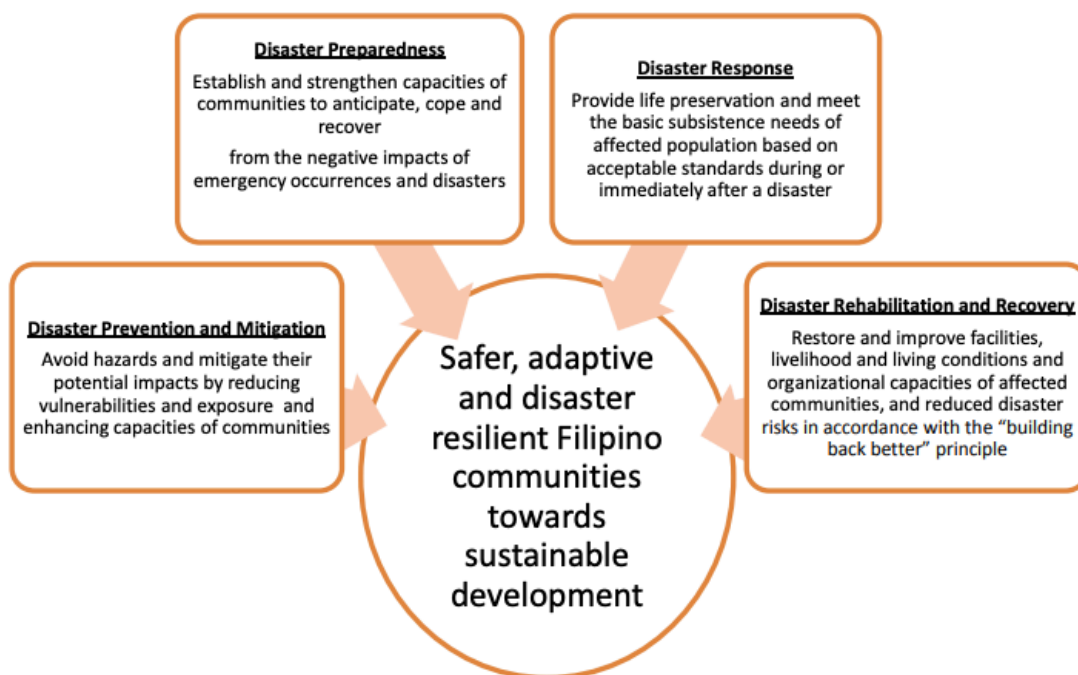


Figure 3. Thematic areas in the NDRRMP⁸⁵

As illustrated by the figure above, the NDRRMP breaks down into four priority areas that work on their own objectives and through different activities to achieve the overall common goal. These thematic areas are highly interdependent due to direct and indirect impacts on each other, and inseparable as one cannot be executed without the others. Furthermore, they overlap each other over time because of the lack of clear starting and ending points between them. Each one of them attends specific outcomes, however, they compose a cohesive whole working to reduce vulnerabilities, strengthen capacities and, above all, address the problems from the root.⁸⁶

⁸⁴ Republic of the Philippines, *NDRRMP 2011-2028*, p. 36

⁸⁵ Republic of the Philippines, *NDRRMP 2011-2028*, p. 15

⁸⁶ Republic of the Philippines, *NDRRMP 2011-2028*, p. 16

The first thematic area is for *disaster prevention and mitigation* and it works towards six outcomes with the central goal of reducing vulnerabilities and building resilience to mitigate potential disaster impacts on communities. The main agency responsible for this area of action is the Department of Science and Technology (DOST), however, the responsibility over the different outcomes is divided among other lead and implementing agencies.

The expected outcomes in this area include integrating DRRM and climate change adaptation (CCA) into development policies, plans and budgets by establishing local DRRM councils, institutionalizing DRRM offices and developing science-based tools for mainstreaming; creating environmental policies with DRRM and CCA components for effective management; strengthening infrastructure resilience through extensive risk assessments for enhanced preparedness; establishing efficient assessment, mapping and monitoring tools for community-based research activities; developing new disaster risk financing modalities and making them available for vulnerable groups; adopting early warning systems for forecasting and hazard warning by sharing information across sectors.⁸⁷

Although the outcomes in this area are quite varied, the focus remains policymaking, monitoring, assessments and research activities for prevention. If we look at it from a health perspective, we see that performing risk assessments in hospitals and other health facilities is crucial for building resilience as they constitute some of the critical infrastructure during and after disasters. Moreover, the DOH should be an active stakeholder in information sharing-systems as this would allow them to determine the health needs of vulnerable groups or communities and help them improve their prevention methods to avoid direct and indirect health impacts.

The second thematic area is focused on *disaster preparedness* and it aims to strengthen coping, adaptive and recovery capacities of communities. Just as in all areas, there is one lead agency coordinating the rest of the partner agencies, which, in this case is the Department of Interior and Local Government (DILG).

⁸⁷ Republic of the Philippines, *NDRRMP 2011-2028*, p. 18-22

The activities in this area are divided into five expected outcomes consisting of increasing the community's levels of awareness; improving the knowledge and understanding of disaster risk and preparedness measures of communities by providing them with trainings at national and local levels, or including DRR in school and university curricula to equip them with skills and capabilities to respond before hazardous events; strengthening Local DRRM Councils and offices; develop national response strategies, providing citizens with clear guidelines for emergency response and ensuring the access to essential services; and intensifying partnership among all key stakeholders.⁸⁸

In this case, we could say that improving the community's knowledge on the health risks of climate-related hazards may help them take more adequate preparedness measures. I would like to emphasize the importance of implementing such trainings at local levels, especially in countries such as the Philippines, considering that the socioeconomic and health status differs quite a lot from urban to rural places, therefore varying the people's level of vulnerability – i.e. the health consequences from disasters can be devastating in certain areas while in others they are just bearable. Thus, strong national plans and partnership are extremely important for addressing the different needs of different persons, as well as for ensuring essential health services in all areas across the country.

The third thematic area is intended for *disaster response* during or immediately after the event in order to meet the basic needs of the affected communities. The overall responsible agency is the Department of Social Welfare and Development (DSWD), however, this is probably the area in which the DOH plays the most important role compared to other areas as it must work directly with the affected persons.

In order to fulfill the general goal, this area sets eight expected outcomes that involve establishing a reliable system to gather reports and information which will, in turn, facilitate the coordination of efficient relief operations; performing immediate assessment reports on the needs and damages; developing a coordinated search and rescue system, as well as a unit for restoring family links; organizing, with the corresponding agencies, a safe evacuation system for the affected

⁸⁸ Republic of the Philippines, *NDRRMP 2011-2028*, p. 23-26

population; ensuring adequate shelter for internally displaced persons as well as child-friendly spaces that offer temporary learning programs if needed; providing the basic social services such as sanitation, medical consultations and treatments to prevent epidemics, nutritional assessments to identify high-risk children and water quality controls to avoid outbreaks of water-borne diseases; addressing the psychosocial needs of affected people through psychological debriefings; and implementing an early recovery system.⁸⁹

In regard to health, this is a clear example of an area for action in which healthcare services are central as it involves the immediate response during and after a disaster. Assessment reports on the health status of the affected persons in hazardous situations help identify the needs that shall be addressed and thereafter the design of protocols that will follow. Furthermore, food, water, sanitation, medical consultations and psychological exams are indispensable for preserving life and well-being, and therefore to mitigate direct health impacts of disasters. However, they cannot be achieved without a previous gathering of information and exhaustive assessments.

The fourth and last thematic area in the NDRRMP covers the necessary actions for *disaster rehabilitation and recovery*, reconstructing facilities and restoring livelihoods of the affected population with the National Economic and Development Authority (NEDA) as the main agency. The activities are designed to accomplish five outcomes, starting with a post-disaster assessment to identify the damages and the needs to be addressed; followed by economic activities and resource mobilization to help the affected communities and sectors restore and strengthen their livelihood; the restoration of housing making them more resilient to disasters under the principle of “build back better”; the reconstruction of climate-resilient infrastructure facilities; and finally the empowerment of psychosocial care workers to address the potential psychological damages of vulnerable groups, provide them with adequate risk protection measures and help them restore life to normal after the disaster situation.⁹⁰

Sometimes the post-disaster landscape can be devastating and, therefore, building resilient housing and infrastructure, and helping communities to restore their economic status and social

⁸⁹ Republic of the Philippines, *NDRRMP 2011-2028*, p. 27-31

⁹⁰ Republic of the Philippines, *NDRRMP 2011-2028*, p. 32-34

services is critical for coping with the situation. However, there needs to be comprehensive assessments to determine the levels of damage in different areas and, most importantly, the health needs of the affected population.

This last area of action highlights the importance of enhancing the skills and capacities of the psychosocial care providers, which includes local and humanitarian workers, to deal with people's mental health. It is highly relevant to underline the importance of building psychological resilience among communities in disaster-prone countries as it can contribute, to a large extent, to a quicker post-disaster recovery and prevent delayed health impacts.

As we can see, the first and the fourth thematic areas can overlap each other in time, however, they are indivisible and fundamental for the development of a solid DRRM system, alongside the other two areas. Considering that they form a united whole, the actions taken in any of the areas will have direct and/or indirect impacts on the rest, and for that reason there is no hierarchy on the priorities but rather they are dependent on the timeline of the events.

In order to obtain financing for high participation and the involvement of key stakeholders in this system, there needs to be effective mechanisms for resource mobilization. On one side, the NDRRMP names a list of funds designed for contributing with monetary resources which, in line with the DRRM Act of 2010, are meant to allocate 30% of the overall funding on disaster response, relief and recovery, and the remaining 70% on pre-disaster measures such as prevention and preparedness.⁹¹ On the other side, the plan mentions the inclusion of non-monetary resources as they can also help achieve the targets. These include, above all, traditional knowledge of indigenous communities on good community-based practices in DRRM.⁹²

Finally, as the world is rapidly changing and, as a result, the patterns in weather conditions and climate-related hazards, establishing monitoring and evaluation systems is indispensable. It is not only an essential aspect for stakeholders to gather information and learn from experience, but also to assess the results of the DRRM activities, as well as to determine the level of contribution of

⁹¹ UNDRR (2019), *Global Assessment Report*, p. 351

⁹² Republic of the Philippines, *NDRRMP 2011-2028*, p. 41

the funds allocated for the accomplishment of the targets. Furthermore, the overall goal of the NDRRMP cannot be fulfilled without constant reviews and evaluations that maintain the plan as adaptive, updated and timely as possible to the changing circumstances.⁹³

3.2.3. Progress in DRRM

Despite the limited resources, over the past years the Philippine government has been able to achieve considerable progress in DRR under the priorities for action of the Sendai Framework and the NDRRMP. This progress, alongside some of the key challenges, has been reflected in the UNDRR Status Report of 2019 on Disaster Risk Reduction in the Philippines.

The report constitutes a snapshot of the Philippine country profile, including geographic, demographic and economic aspects, as well as vulnerabilities and exposure. Thereafter it provides a general overview of the latest achievements and key interventions in DRR related to the other global frameworks of 2015 (the 2030 Agenda and the Paris Agreement).

The Philippines has succeeded in developing a strong system for collecting information and performing risk assessments in different areas and sectors, which responds to the guidelines of the first priority for action in the Sendai Framework (Understanding Disaster Risk) and, in turn, to thematic area 1 in the NDRRMP (Disaster Prevention and Mitigation).⁹⁴ In order to understand risks and hazards, scientific and technological innovation programs have been integrated and prioritized in local plans and coordinated by the DOST. In terms of health, some institutions at the local level have established comprehensive plans – such as the Health Emergency Preparedness, Response and Recovery Plan – which provide specific actions for health facilities in times of natural hazards and contribute with an all-hazard approach to the national level. Furthermore, the DOH, in collaboration with the WHO, developed a health-based software to gather data from health institutions in emergency situations regarding NCDs and infectious disease outbreaks for early detection and to prevent an epidemic outbreak, thus reducing morbidity and mortality.

⁹³ Republic of the Philippines, *NDRRMP 2011-2028*, p. 41

⁹⁴ UNDRR, *Status Report 2019*, p. 14-15

Some other innovations include disaster mapping through web applications that collect updated and timely information on the weather and tides, as well as the potential risks and impacts of hazards, which allows them to have a steady early warning system. The only issue reported on this point is the lack of documentation, which should be strengthened – together with cross-sector collaboration – to increase the credibility of the Philippines internationally as an exemplar in DRRM. However, experts have already proposed the Philippines as a global hub and “laboratory” for DRR research and innovation due to their high commitment to the matter.⁹⁵

Under the second priority for action of the Sendai Framework (Strengthening Disaster Risk Governance to Manage Disaster Risk), the Philippines has developed different plans and policies for DRRM since the 1970s. However, although these legal foundations have enabled the use of local funds for preparedness and mitigation, the activities have mainly been focused on disaster response and were therefore insufficient. As a result, the government enacted the DRRM Act of 2010 (presented above), which is currently the foremost instrument guiding actions at all governance levels.

The main decision-making body, as established by the NDRRMP, is the National Council, which is composed by members of relevant government agencies, local government units, civil society organizations and the private sector.⁹⁶ It is important to emphasize the need of collaboration between the DOH, the DOST, NGOs and other key stakeholders to ensure the protection and preservation of human health in the event of a disaster. In that sense, DRRM governance in the Philippines is quite outstanding because of the high levels of participation from different sectors, the capacitation of local units and most importantly, the involvement of the civil community, which contributes to the implementation of thematic area 2 of the NDRRMP (Disaster Preparedness).

In regard to the third priority in the Sendai Framework (Investing in Disaster Risk Reduction for Resilience), the Philippine government has been exploring different budgeting mechanisms. As the DRRM Act of 2010 stated, around 5% of income from regular sources should be allocated

⁹⁵ Banwell, N., Montoya, J., et al., [online], Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5109717/>

⁹⁶ UNDRR, *Status Report 2019*, p. 15-17

to DRR and resilience activities. The expected share for prevention, preparedness and mitigation measures is 70% of the total budget, while the remaining 30% will be dedicated to a Quick Response Fund for financing the post-disaster operations.

Although this financial structure promotes resilience and capacity building of critical infrastructure (such as hospitals) through prevention and preparedness measures, which is indeed essential to reduce risks and vulnerability, the main challenge remains resource mobilization for response and recovery activities, such as restoration. Thus, considering that it is crucial to reconstruct health facilities for instance, as well as housing and other infrastructures, the government is working to develop a system that will encourage local investment in DRR, and therefore facilitate the access to resources in the post-disaster scenario.⁹⁷

Progress under the fourth and last priority (Enhancing Disaster Preparedness for Effective response to “Build Back Better” in Recovery, Rehabilitation and Reconstruction) covers most operations in all thematic areas of the NDRRMP. Some of these achievements include, good practices in participation of key stakeholders; monitoring and evaluation mechanisms established by innovative programs (presented above) that facilitate sophisticated hazard mapping and early warning systems via mobile phones for instance; new post-disaster needs assessments that include economic and social damages in the public and private sector, compared to previous assessment systems that only used to cover public assets; the change of approach in the recovery phase, now more focused on the long-term under the “build back better” principle; and the increasing local investment through microfinance institutions and cooperatives that provide assistance to persons in rural places, and implement emergency employment programs to help them restore their livelihoods.⁹⁸

The long-term vision of the Philippines policies and plans for DRRM operations is key for understanding the integrated risk management approach. As we have seen, these plans have been designed to build resilience and minimize risks and disruption in social services which is essential

⁹⁷ UNDRR, *Status Report 2019*, p. 17-18

⁹⁸ UNDRR (2019), *Status Report 2019*, p. 18-19

to preserve human health, prevent infectious disease outbreaks in the event of natural hazards and maintain the capacities of the health care system.

3.3. Development in the Philippines

Over the past decade, the Philippines has gone from being a low-income country to a better-performing economy due to the previous Development Plan (2011-2016), which focused on inclusive growth and poverty reduction. The current Philippine Development Plan (PDP) 2017-2022 is based on the same goals as the preceding one, however, it has added an important economic factor: to set the grounds towards a globally competitive economy while ensuring ecological integrity.⁹⁹ Thus, this is the first integral socioeconomic plan in the Philippines that includes a sustainable development approach, in line with the global framework (the 2030 Agenda for Sustainable Development).

The plan emphasizes the importance of adopting a long-term perspective because of the persistence required for the processes of economic, social and institutional transformation, and therefore improving lives and obtaining the desired economic progress can take years. The general vision is to achieve a society by 2040 in which poverty has been eradicated, the middle class is predominant, people have higher life expectancy and there is equality of opportunities.

Hence, as human development is the central point in the plan, the government must use different strategies to strengthen people's skills and capacities by investing in human capital, scientific and technological innovation, high-quality infrastructure and urban development, and adopting inclusive finance mechanisms.¹⁰⁰

The PDP is an extensive document composed by all-inclusive strategies, frameworks and targets in different areas of action. These areas include the development of economic opportunities, human capital, infrastructure, public administration, justice, access to social services and

⁹⁹ Republic of the Philippines (2017), *Philippine Development Plan (PDP) 2017-2022*, Manila, Chapter 1: The Long View, p. 1

¹⁰⁰ Republic of the Philippines, *PDP 2017-2022*, Chapter 1, p. 1-5

environmental protection. However, the focus in the following analysis will be on the common points with the overall goal of the NDRRMP of building safer and more resilient communities.

3.3.1. Building resilient communities: general aspects

Amongst the different goals of the PDP, there is one that is quite relevant to fulfil the rest – but most importantly to achieve human development – which is *resilience building* at all levels. As we can see, this specific goal is related to the main objective of the NDRRMP and can therefore be implemented through DRRM activities across different sectors. The PDP notes that, considering the World Risk Index rank of the Philippines as a high-risk country in regard to natural hazards, actions should be taken to build resilient communities by reducing risk and exposure, mitigating disaster impacts and reinforcing recovery and rehabilitation systems.¹⁰¹

The Plan also acknowledges the need for making communities more resilient to contribute to the enhancement of people's life expectancy, which is highly dependent on their capacities to cope and adapt to hazardous events.¹⁰² Moreover, past experiences in the Philippines have showed that if families, individuals and even the economic sector were more resilient and prepared to the impacts of natural or human-induced disasters, the post-disaster recovery process would be much more agile and poverty incidence would decline.¹⁰³ However, this requires action in different areas, such as strengthening institutional response, building resilient infrastructure, making a sustainable use of natural resources and, naturally, protecting human development. The following points summarize the main guidelines for operations related to resilience building in the PDP:

- **Innovation:** the first step towards a more safe and resilient community is to perform nationwide disaster vulnerability assessments to identify the most exposed groups to the threats of climate change and disasters. For this, the involvement of scientific and technological agencies is crucial to establish innovative methods of science-based analysis, hazard mapping and risk assessments that will thereby help apply the best possible

¹⁰¹ Republic of the Philippines, *PDP 2017-2022*, Chapter 4: Philippine Development Plan 2017-2022 Overall Framework, p. 4

¹⁰² Republic of the Philippines, *PDP 2017-2022*, Chapter 1, p. 3

¹⁰³ Republic of the Philippines, *PDP 2017-2022*, Chapter 4, p. 3

measures to reduce and prevent damage and loss from disasters.¹⁰⁴ The PDP points out the need of encouraging not only public but also private science, technology and innovation institutions to participate, alongside regional partners, in research projects to explore effective solutions.¹⁰⁵

Promoting innovation is one of the central ideas presented in the PDP for working towards poverty eradication and a more just and equal society – in line with SDG 9 in the 2030 Agenda (industry, innovation and infrastructure). Considering the progress made, the Philippines are moving forward on this field to position themselves as a global hub for DRR, they are eager to invest in innovation hubs – most notably for disaster prevention activities – through the development of platforms, web-based systems and software that allow them to perform mapping and assessments, share information on early warnings, best practices and technologies.¹⁰⁶

For the health sector, all the aforementioned innovative methodologies should be useful to strengthen the monitoring systems in hospitals and other health facilities, identify health needs, design adequate and effective measures to minimize disaster risk and vulnerability, mitigate direct and indirect health impacts and, as a result, build resilience.

- **Infrastructure:** resilience building is most commonly understood as improving and securing the operational life of critical infrastructure, and while it is not the only aspect that should be considered when talking about building resilient communities, it certainly is extremely necessary. Infrastructure facilities are central when developing DRR strategies as the degree of resilience is a determining factor of the potential damages and the coping capacity of these facilities to recover from a disaster. For this reason, the PDP stresses the concept of exploring new methods of building sustainable infrastructure and expanding their physical and organizational capacities before the effects of natural hazards.

¹⁰⁴ Republic of the Philippines, *PDP 2017-2022*, Chapter 3: Overlay of Economic Growth, Demographic Trends and Physical Characteristics, p. 12

¹⁰⁵ Republic of the Philippines, *PDP 2017-2022*, Chapter 14: Vigorously Advancing Science, Technology and Innovation, p. 11

¹⁰⁶ Republic of the Philippines, *PDP 2017-2022*, Chapter 14, p. 10

Some of the capacities mentioned in the plan include the construction of climate-resilient infrastructure, the development of technological systems, the improvement of their safety, security and supply chain connectivity, the access to material and human resources in emergency situations, and the establishment of comprehensive protocols for disaster response.¹⁰⁷ All these points are highly important as they contribute to a better prepared health care system and thereafter to a more coordinated response allowing critical infrastructure facilities, such as hospitals, to meet the health needs of the affected population and help them recover and rehabilitate.

However, resilient infrastructure does not exclusively mean critical facilities, but it also involves building safe, secure and disaster-resilient housing. It is important to remember that the civil society is among the most affected in the event of disasters (if not the most) and, therefore, the impact on their health and well-being is directly connected to the degree of resilience in housing. On the other side, the plan points out the need of building affordable resilient housing in order to provide underprivileged or homeless families with emergency accommodation as part of the disaster relief operations.¹⁰⁸

- **Finance:** the PDP establishes different targets and strategies to create resilient and inclusive financing. Having into account that DRRM actions require risk-informed budgeting mechanisms that have an inclusive approach regarding the needs of the affected groups, as well as adequate logistics, the development plan encourages public-private partnerships – i.e. investment from the private sector for the fulfillment of activities in the public sphere. Such collaboration is seen to lead to a decline in the fiscal burden of the government, therefore allowing them to build resilience by using public resources to cover other essential social services such as health care, innovation or investment in existing health infrastructure. Additionally, pursuing international cooperation in times of disasters can also help communities recover quicker, and prevent a post-disaster financial crisis.¹⁰⁹

¹⁰⁷ Republic of the Philippines, *PDP 2017-2022*, Chapter 19: Accelerating Infrastructure Development, p. 30

¹⁰⁸ Republic of the Philippines, *PDP 2017-2022*, Chapter 19, p. 27

¹⁰⁹ Republic of the Philippines, *PDP 2017-2022*, Chapter 15: Ensuring Sound Macroeconomic Policy, p. 2

Another finance mechanism mentioned in the plan which is relevant to build resilient communities from the local level is developing microfinancing initiatives. Nearly 44% of the population in the Philippines lives in rural areas and, therefore, projects that promote the efficient use of the most common livelihood activities in those areas to generate benefit can strengthen their coping and adaptive capabilities.¹¹⁰ We can say that this is a resilient and inclusive monetary strategy that provides financial stability, improves individual capacities and reduces the risk of delayed health impacts from disasters.

- **Environment:** as we have seen, the PDP is the first strategic document that provides integrated approaches for action and includes environmental protection and the sustainable use of natural resources as one of the main pillars for development. This is mainly due to the adoption of the 2030 Agenda for Sustainable Development in 2015 which, as a global framework, sets 17 goals for governments to prioritize in their development plans. Among them is protection of life on earth (SDG 15) and below water (SDG 14), as well as a responsible consumption and production (SDG 12)¹¹¹.

Observing that ecosystems in the Philippines are vital to provide essential raw materials for food and water supply, for the preservation of the biodiversity as well as for the development of recreational activities, the PDP emphasizes that environmental integrity should be ensured to guarantee economic growth, but also to build resilience to the impacts of disasters and improve social welfare.¹¹² Thus, the protection of the environment is a key aspect to build more resilient communities, satisfy basic needs and alleviate direct health impacts of disasters.

3.3.2. Resilience in the Health Sector

All the above points contribute, directly or indirectly, to build resilience and protect human health in the event of disasters; however, the PDP establishes some guidelines specifically for development and resilience in the health sector. The general vision of the PDP is divided into four

¹¹⁰ Republic of the Philippines, *PDP 2017-2022*, Chapter 15, p. 8

¹¹¹ UNGA (A/RES/70/1), p. 14

¹¹² Republic of the Philippines, *PDP 2017-2022*, Chapter 20: Ensuring Ecological Integrity, Clean and Healthy Environment, p. 1

main areas for strategic action of which one is focused on promoting quality and affordable universal health care, ensure social protection and move towards longer and healthier lives. This area for action consists of the five following targets which, as we can see, are linked to some of the targets in the SDG 3 of the 2030 Agenda:

- *“Reduction of infant mortality rate through quality maternal health and childcare*
- *Reproductive health and family planning programs*
- *Eradication of malnutrition*
- *Programs and facilities to encourage development of healthy lifestyles*
- *Efficiently managed natural resources and environment”*¹¹³

In order to fulfill these long-term targets, the PDP provides some strategies for action which will be focused on strengthening and expanding the national healthcare system. The overall objective in the Philippines is to achieve universal healthcare coverage to lower the mortality rate, especially among children and women, and contribute to a demographic transition. Having into account that emergency situations and natural hazards can lead to a disruption in social services and the food chain production causing therefore malnutrition, the provision of water, health care services and sanitation in those scenarios is vital to reverse the health threats¹¹⁴.

In previous sections we explained briefly the mechanics of the Philippine healthcare system, which is partly subsidized by the government and partly from the private sector. Despite the fact of being a high-quality system, universal access to healthcare services is vital for achieving the above targets considering the demographic and socioeconomic differences between urban and rural settings.

Following the provisions of the PDP, universal access, quality nutrition and health interventions for all should be ensured through the expansion of networks of health facilities and health care providers to reach as many people as possible and provide them with basic health services such as reproductive health, nutrition or health emergency response services. These

¹¹³ Republic of the Philippines, *PDP 2017-2022*, Chapter 1, p. 6

¹¹⁴ Republic of the Philippines, *PDP 2017-2022*, Chapter 10: Accelerating Human Capital Development, p. 4

networks will be gender- and culturally oriented and will focus on primary health care services as they are the foundations for a healthy population. However, they will also promote the access to specialty health centers if needed. In the event of emergency and disasters, these networks should be highly responsive and resilient, and should use innovative technologies for information-sharing to be able to effectively coordinate public and private supply-investments, medical interventions and local and humanitarian workers.¹¹⁵

One of the main challenges in universal health provision in countries with such demographic diversity as the Philippines, is the lack of health education and health-seeking behavior among the most vulnerable populations – i.e. the poor, older people or indigenous communities. Therefore, the PDP highlights the need of increasing awareness of health entitlements, occupational health, as well as health risks of natural hazards which should, in turn, improve health-seeking behaviors, bring higher participation and guarantee equity in access to healthcare services.¹¹⁶ Annual health visits to the most vulnerable communities should be one of the main starting points to be able to monitor people's health status, especially in times of disasters as it can help prevent indirect and/or delayed health impacts.

Lastly, strengthening and expanding networks of health care providers and improving health awareness among the population requires an upgrade of hospitals and other health facilities. According to the numbers presented in the PDP, between 2010 and 2016 a total of 7.713 health facilities were reconstructed and upgraded, which has indeed helped provide primary health care services to a wider range of the community¹¹⁷. However, more equipment is needed to enhance emergency response plans, but also to meet the overall expected outcomes in health. For this, it is necessary to improve human resources in health facilities in quality and quantity, increase the stockpile of health supplies such as medicines or vaccines, expand laboratory capacities to obtain multi-specialty coverage, and upgrade facilities to promote maternal and newborn health care services¹¹⁸.

¹¹⁵ Republic of the Philippines, *PDP 2017-2022*, Chapter 10, p. 16

¹¹⁶ Republic of the Philippines, *PDP 2017-2022*, Chapter 10, p. 15

¹¹⁷ Republic of the Philippines, *PDP 2017-2022*, Chapter 10, p. 1

¹¹⁸ Republic of the Philippines, *PDP 2017-2022*, Chapter 10, p. 16

Actions in all of the above points should contribute to a more resilient health care system in times of disaster, but most importantly to a long-term improvement in human health. Thus, we can say that prevention, preparedness and recovery strategies in the health sector lead to resilience building and facilitate the response process by alleviating the immediate health issues and providing long-term care, supervision and evaluation.

3.3.3. The Sustainable Development Approach

The previous sections of this paper focused on resilience building in different sectors. However, it is worth mentioning that, because disasters are a development concern in the Philippines due to the potential disruption of natural and human systems, building disaster and climate resilient communities is present across most chapters of the PDP.

The international community was also aware of the interrelation between climate change and other SDGs (such as health or infrastructure) when they adopted the 2030 Agenda and established *Climate Action* as one of the goals of an indivisible whole. Some of the interactions between SDGs have already been studied, and some others are currently being studied. Our analysis of DRRM and development operations has allowed us to identify further unidirectional interactions (some have higher scoring than others) between SDG 3 and SDG 13 than the ones presented in the theoretical framework – which were focused on the health impacts of air and water pollution.

As illustrated by Table 3, we can see that most targets of SGD 13 can contribute, directly or indirectly, to the achievement of the targets in SDG 3 if analyzed from a DRRM approach with focus on human health. The first group of interactions is based on building resilience to respond to natural hazards which, in the long term, can help reduce maternal and neonatal mortality, and premature deaths from NCDs by strengthening the capacities of health facilities and the skills of health workers.

The second group is related to policy integration, i.e. including DRRM and climate adaptation in national strategies and development plans which, as we have seen in previous sections, can help promote universal health coverage, including sexual and reproductive health.

The third interaction involves preventive measures such as rising awareness on climate-related risks, as well as developing early warning systems to maintain the population well-informed, which will directly influence the way health risks are managed.

The fourth and last interaction make refers to the development of effective management mechanisms for climate change-related activities, which can help adopt risk-informed budgets and advocate for an increase in high qualified health workers.

The 2030 Agenda includes DRR measures in other SDGs, however, among the most significant for health in times of disaster are probably innovation, infrastructure, water and sanitation, which have been broadly mentioned throughout our analysis. Nevertheless, a more detailed study on the interaction between these SDGs would require further research on the topic.

SDG 13 Targets ¹¹⁹	SDG 3 Targets ¹²⁰
<p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</p>	<p>3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births</p> <p>3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births</p> <p>3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being</p>

¹¹⁹ UNGA (A/RES/70/1), p. 23

¹²⁰ UNGA (A/RES/70/1), p. 16-17

<p>13.2 Integrate climate change measures into national policies, strategies and planning</p>	<p>3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs</p> <p>3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all</p>
<p>13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning</p>	<p>3.D Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks</p>
<p>13.B Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities</p>	<p>3.C Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States</p>

Table 3. SDG Interactions

4. LESSONS LEARNED FROM THE PHILIPPINE MODEL

The Sendai Framework mentions that, in order to strengthen DRR governance (Priority 2), it is important “*to promote mutual learning and exchange of good practices and information through, inter alia, voluntary and self-initiated peer reviews among interested States*”¹²¹. The Philippines have already been proposed as a global hub for research and innovation in DRR. However, through our qualitative data collection and document review we have been able to identify further good practices in the Philippine model for development, which should be part of the shared knowledge between states.

¹²¹ UNISDR, *Sendai Framework*, p. 18

The main key finding is that, due to the high exposure to the risks of climate-related hazards (as well as other natural hazards), the Philippines has adopted an integrated risk management approach. This governance method includes immediate disaster relief while promoting long-term recovery and development through prevention and preparedness measures. There are five main entry points, as explained in section 3.1, that should be taken into account to obtain an integrated risk management approach, which include: policy and law integration, the institutionalization of DRR, the involvement of key stakeholders, the use of information technologies and the development of risk-informed budgets.

The first entry point, which is integration and adaptation processes of *policy and law*, is quite advanced in the Philippines, considering that the PDP is a highly risk-informed development plan. On one side, we have presented the main legal and operational frameworks for DRRM-related activities, which are the DRRM Act of 2010 and the NDRRMP. These frameworks are aligned with the guidelines of the Sendai Framework, and consist of four areas for action that might overlap each other in time but are indivisible (disaster prevention, preparedness, response and recovery). Building resilience is the main objective of the prevention, preparedness and recovery processes which, in terms of health, contributes to the strengthening of health facilities and human capacities to respond to the impacts of disasters.

On the other side, the general vision of the PDP is to build resilient communities for a long-term development. Thus, resilience building across sectors (including the health sector) is highly present throughout the whole plan, making it one of the main ideas for strategic action. We can say therefore that the PDP has integrated the concepts of disaster risk and resilience – which are the essence of DRRM – into its agenda.

The second point, *organization and institutionalization* of DRR, is supported by the NDRRMP as it emphasizes the importance of establishing permanent offices for DRRM at the national level, but also at the local level, with the so-called local government units, in order to collaborate with other specialized government departments. Action from the local level is crucial to achieve higher visibility of the vulnerable groups, as well as to reach as many people as possible – including communities in rural areas. The PDP is also quite consistent in regard to the coordination and

collaboration between different government agencies – such as ad the DOH, the DOST and the DSWD – that can contribute with different resources and knowledge, help overcome governance challenges while promoting the sustainable use of natural resources.

This leads us to the third point, the involvement of key *stakeholders* to share responsibilities in DRR and resilience building. Both the NDRRMP and the PDP recognize the need of cooperation among the public and the private sector, as well as an active participation of the civil community. First of all, the DOH should be an active stakeholder in developing information-sharing systems among hospitals and other health facilities to prevent, for instance, epidemics or infectious disease outbreaks in the event of a disaster, as well as identify the health needs of the population. The participation of public and private science, technology and innovation research institutions is crucial, especially for disaster prevention activities as they can develop systems for early warning, risk and vulnerability assessments.

Furthermore, legislators and development actors should help adapt and integrate laws and policies to establish an integrated risk management and development approach which, in the case of the Philippines, is being largely implemented (as we have seen with the PDP) and can contribute, for instance, to the construction of more disaster-resilient housing and infrastructure. Moreover, the involvement of NGOs and civil society organizations, coordinated by the DOH, can be of great importance in emergency response and disaster relief operations, including local and international humanitarian workers, primary, secondary and tertiary healthcare providers, specialized rescue teams and psychosocial care providers. Finally, all these stakeholders should have strong partnerships among them and with the civil population, whose presence in DRRM and development plans is quite substantial in the Philippines. Considering that the civil society is the most affected group in hazardous situations, providing them with disaster and health risk knowledge as part of the preparedness process can help them be more resilient and adaptive to the effects of disasters.

The fourth point, access to information and *knowledge*, is probably the main aspect in the NDRRMP and the PDP for preventing and mitigating disaster risk and vulnerabilities. Both plans note that through innovative and science-based technologies it is possible to develop strong early

warning, risk assessment, monitoring and evaluation systems that contribute to prevention and preparedness, resilience building across sectors different sectors, but also help the government identify people's needs to plan and coordinate posterior response and recovery actions accordingly.

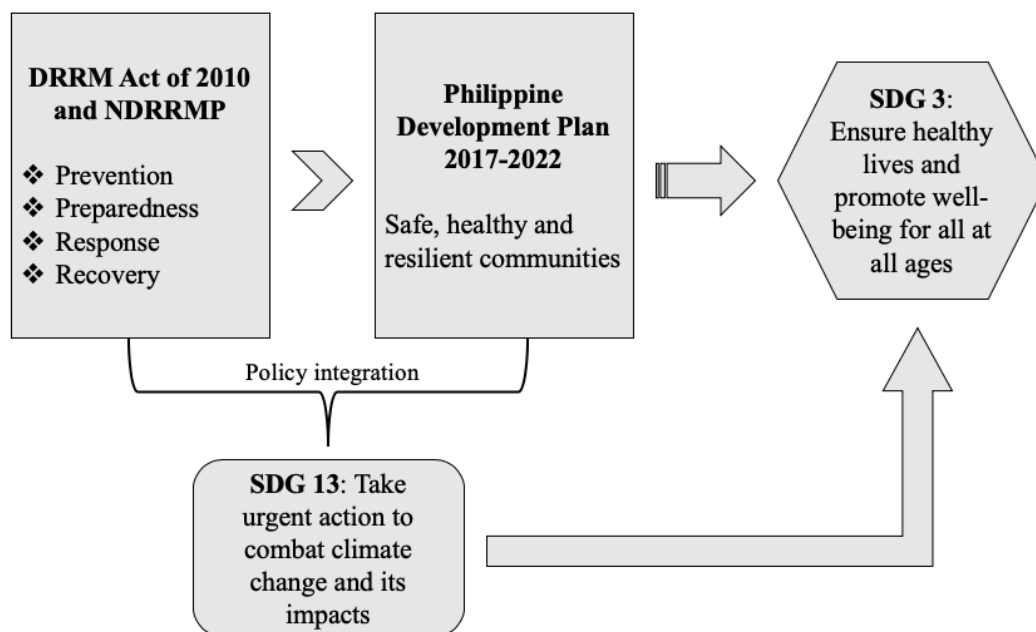


Figure 4. The Philippine integrated risk management approach

However, the differences in the socioeconomic and health status between populations in urban and rural areas must be taken into consideration when developing adequate preparedness, response and recovery plans. Therefore, increasing the knowledge in communities at risk on the health risks of disasters, for instance, through health education campaigns that improve their health-seeking behavior, can help enhance their health and well-being in emergency situations as well as in the long-term.

The last entry point is *finance*, which highlights the need of establishing risk-informed budgeting systems in development plans to work towards the sustainable development goals. Risk-informed budgets involve a shift in national priorities, from traditional investments in short-term actions for emergency relief, to more expenditure in long-term activities. The NDRRMP sets specific guidelines for DRRM financing of which 70% should be allocated to disaster prevention and preparedness operations, and the remaining 30% on immediate response. The PDP, on the

other side, encourages the involvement of the private sector in the investment for resilience building purposes. Furthermore, it proposes the development of microfinancing initiatives to help vulnerable communities in rural settings improve their livelihood, therefore strengthening their resilience to the impacts of natural hazards.

In summary, the DRRM Act of 2010 and the NDRRMP establish the areas for action in the Philippines – a country highly exposed to the effects of climate change and climate-related hazards –, and they indicate that policy integration should be managed from within the development sector. On the other hand, we have seen that the PDP has widely integrated into its framework resilience building at the national and local level, which not only corresponds to the objectives of DRRM, but also provides a long-term vision for development.

The integration of DRRM strategies into the national development plan to officially institutionalize DRR, coordinate key stakeholders, encourage innovation for information-sharing and early warning systems, promote risk-informed budgets, and most importantly, build safe and resilient communities, is the so-called *integrated risk management approach*. Such strategic actions were traditionally part of DRR only. However, as they have been incorporated into the PDP – in line with the targets of SDG 13 –, we can say that the case of the Philippines is a successful example of an integrated risk management approach (see Figure 4), which aims to strengthen resilience in communities and the health sector (among others), thus promoting the implementation of some of the targets in SDG 3 – as illustrated in Table 3.

However, one of the challenges posed by this system remains the priorities of some companies and sectors, which still focus on short-term business, standing in the way of long-term development.¹²² This can certainly complicate collaboration across sectors, or private investment, for instance. Another problem is that the global framework for DRR (Sendai Framework) is a soft law legal instrument and, therefore, adopting an integrated risk management approach is highly dependent on government priorities. Nevertheless, the Philippine model proves that experience leads to good practices and priorities.

¹²² UNDRR, *Global Assessment Report*, p. 349

5. CONCLUSIONS

Climate change is developing at a dangerous pace, impacting natural ecosystems and human health, and posing a threat for progress on sustainable development. European countries might not be experiencing the devastating effects of climate change, however, dealing with frequent climate-related hazards – such as cyclones, heavy precipitations and floods – is a reality in regions such as Southeast Asia, the Caribbean and Sub-Saharan Africa.

Experts have divided the health consequences of climate-related disasters into three categories, depending on the time frame of the impact. The first group consists of injuries or deaths directly caused by an extreme weather event or any other hazardous event. The second group is linked to infectious disease outbreaks generated by the climatic and environmental conditions of disasters. The third and last group are the delayed impacts, caused by a disruption in human systems such as social services, employment or infrastructure deterioration, which are highly influenced by the degree of people's vulnerabilities and socioeconomic status.

The Republic of the Philippines is ranked among the most exposed countries to these health impacts of climate change. In order to reduce and mitigate disaster risk, build resilience and strengthen their response capacities, the government has developed comprehensive legal and operational frameworks throughout the years. They have established four main areas for action which are the basis of DRRM and include disaster prevention, preparedness, response and recovery. It has been appointed in these plans that the focus should be on investing time and resources in strengthening preventive measures and building resilience to alleviate and facilitate post-disaster operations and the subsequent recovery.

These legal instruments are aligned with the guidelines of the international framework for DRR (Sendai Framework), which was designed to guide specific actions focused on addressing underlying risk drivers, and to encourage states to integrate such activities in national development plans, policies and budgets at all levels. In other words, the Sendai Framework claims that if DRRM is done adequately and integrated into development processes, it can contribute to attain some progress in sustainable development.

On the other side, in 2015 all UN member states adopted the 2030 Agenda for Sustainable Development in the context of climate change, which aims to set a general vision for poverty eradication and long-term prosperity of the planet as a whole. The Agenda exhorts states to take urgent action to combat the effects of climate change by building resilient communities and, among others, strengthen national health care systems to handle the health impacts of climate-related hazards (SDG 3).

The latest plan for development in the Philippines is the PDP 2017-2022, in which we can identify the general vision of the 2030 Agenda regarding climate action. The central objective of the PDP is to build safe and resilient communities from the national and local level – which includes economic, human and environmental development. Through our analysis we have observed that building resilience in the health sector is of great importance to avoid direct, indirect and delayed health impacts of climate-related disasters. For instance, working towards universal health coverage; strengthening resources and human capacities in hospitals and other health facilities; improving the communities knowledge on the health risks of disasters; reinforcing primary health care services to prevent premature deaths or the worsening of NCDs; increasing collaboration between the public and the private sector for finance; enhancing the livelihoods of vulnerable groups to mitigate potential delayed health impacts; and developing appropriate early warning systems as well as health-risk assessments to detect possible infectious disease outbreaks.

To conclude, the key finding of this paper is that the PDP is a great example of risk-informed development and policy adaptation to the conditions of a highly exposed country to climate change. Thus, a DRRM perspective and an integrated risk management system provides opportunities to implement the SDGs, and more specifically SDG 3. This can be relevant for development and policy adaptation processes worldwide in the context of climate change in a rapidly changing world.

6. FURTHER RESEARCH

The analysis conducted on this paper has been largely theoretical and, while it has provided us with the basis for a better understanding on how to implement policy integration, further research

on this topic could be useful to achieve a more empirical approach. This type of study requires a specific case to be able to exemplify in detail the key findings and avoid generalizations. Nevertheless, there can be variability on DRRM measures and development processes from country to country depending on the burden of ill health.

For this reason, it could be relevant to examine a specific climate-related disaster – or even a health emergency such as the Covid-19 pandemic – to determine how an integrated risk management approach contributes to strengthen the response capacity and the subsequent recovery and development process.

Following our line of research, it would be necessary to select a particular country and perform a demographic study, as well as an exhaustive review of the health status before and after the disaster/health emergency in the different groups and communities. Thereafter, there should be an assessment of the socioeconomic impacts of the emergency, and the effectiveness of prevention, preparedness and relief operations. Such research would require a large time frame to be able to evaluate the long-term health gains of policy integration and identify the potential stressors affecting resilience – where field studies would be a strong asset to amplify the data collected.

As we have seen, this is a complex subject that involves a great number of stakeholders, from the national and local levels to the international arena. Thus, as we concluded that the integration of DRRM in development policies can be achieved through experience and good practices, an empirical study on this topic would give great value to this theoretical research.

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